



The Minuteman Repeater Association

The Minuteman

Volume 35, Number 4

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Mendon is on the Air!



Months of work and planning culminated last Friday in the newest MMRA repeater going live. The bucket truck, arranged by a club member, arrived atop Inman Hill in Mendon at midday, with to find a temperature of 28 degrees Fahrenheit and 30 MPH wind gusts.

The crew was undeterred however, and the antenna was installed. Special thanks go to Bryan W1BRI, and Wayne N1XXI who, along with Bill the bucket truck operator, did most of the heavy lifting. Kevin K1KWP, Andy N1BHI, and Jim AE1C were also there to help. This is late breaking news. A full article on the new repeater will be available in the May issue. In the mean time, give it a try – 146.610 input –600KHz, with a MMRA standard tone of 146.2. *Additional photos inside.*

NEXT CLUB MEETING WEDNESDAY – MARCH 15th

Our next club meeting will be held on Wednesday March 15th, 7:30 PM at the Massachusetts Emergency Management Agency Headquarters at the intersection of Route 30 & 126 in Framingham. Directions are on the web at <http://www.mmra.org/dir/mema.html>. Lou Harris, N1UEC, who was active with Angel Flight during Hurricane Katrina rescue operations, will be sharing his experiences with us.

The MMRA Repeater Network

Location	Output	Offset	PL	Callsign	Default Link State
Brookline	146.820	-600 KHz	146.2	K5TEC	Linked
Hopkinton	223.940	-1.6 MHz	103.5	N1BHI	Linked
Marlborough East	53.810	-1 MHz	71.9	W1BRI	Unlinked
Marlborough West	147.270	+600 KHz	146.2	W1MRA	Linked to Bolton 10AM-4PM Weekdays 9AM-7PM Weekends
	224.880	-1.6 MHz	103.5	W1MRA	Linked to Bolton Fulltime
	449.925	-5 MHz	88.5	W1MRA	Network HUB
	144.390	n/a	n/a	W1MRA	--
Mendon	146.610	-600 KHz	146.2	N1BHI	Linked
Quincy	146.670	-600 KHz	146.2	W1BRI	Unlinked
	224.400	-1.6 MHz	103.5	N1KUG	Linked
Shrewsbury	449.575	-5 MHz	88.5	W1BRI	Linked
Stoneham	146.715	-600 KHz	146.2	N1NVL	Unlinked
	446.725	-5 MHz	88.5	N1NVK	Linked
Weston	146.790	-600 KHz	146.2	N1BE	Unlinked
	224.700	-1.6 MHz	103.5	N1NOM	Linked
	442.700	+5.0 MHz	88.5	N1NOM	Linked
Affiliated Repeaters are repeaters not owned by MMRA, but capable of linking into the MMRA system:					
Bolton	29.620	-100 KHz	131.8	W1OJ	Linked to MRW
Brookline East	447.875	-600 KHz	136.5	K1IW	Linked
Milford	446.825	-5 MHz	100.0	WA1QGU	Unlinked
Norwell	145.250	-600 KHz	77.0	AC1M	Unlinked
	443.600	+5 MHz	88.5	NS1N	Unlinked

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SIX METER J-POLE – A GREAT STARTER DO-IT-YOURSELF PROJECT

James Cahill, KB1LOY

DECISION TO BUILD A HOMEBREW ANTENNA

This article is written more to encourage you to go ahead and build your own antenna than provide you with any electronic theory or wisdom. If I can build one with limited knowledge and skills in electronics, so can you. My decision to build a homebrew antenna emerged from three factors: 1) my dual band antenna did not perform well with my new quad band radio (Yaesu FT-8900R); 2) I heard other hams on the air describing their homebrew projects and felt a j-pole was within reach for me; and 3) I figured that by studying the theory/details of antenna construction my skill as an operator would improve.

DESIGN RESEARCH

Three primary sources were used to research the details of the 6M j-pole antenna. The 2005 ARRL Handbook, the Amateur Radio Resource Guide located on the website www.dxzone.com, and K4ABT, Buck Rogers <http://www.hamuniverse.com/jpole.html>. The ARRL Antenna Handbook is also an excellent reference; I just did not have a copy at the time I was building the antenna. You may find slight variations of the basic designs you find on-line, study them closely.

A word of caution while conducting your research: watch out for information overload. Select a design you feel most comfortable with and stick with it. I found K4ABT's plans the most straightforward and used them for the most part.

You will need to decide your "target transmit frequency" in order to calculate the lengths of the various elements. I reviewed local and emergency six-meter repeater frequencies and selected 52.23 MHz (TX, Mt Greylock) as my target. There are several other repeaters near this TX frequency (TX 52.19MHz-Monadnock, TX 52.25MHz-Waltham, TX 52.27MHz-Framingham, and TX 52.31MHz-Mt Wachusett). I reasoned: better to have a design length to a target frequency of a distant repeater than to try to reach it by boosting watts during transmitting.

MATERIALS

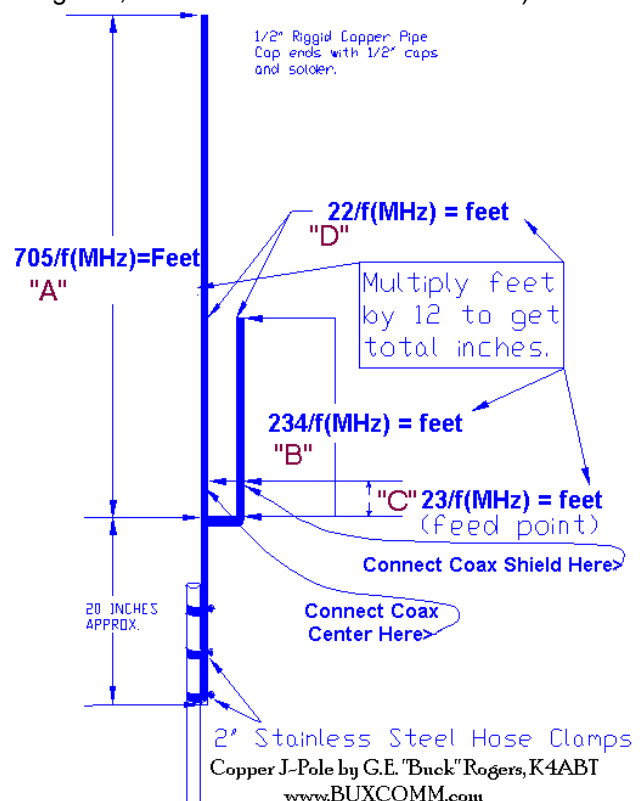
Calculate the TX frequency and buy the materials.

1 EA - 3/4" copper pipe, 10 ft length	\$10.00
1 EA - 1/2" copper pipe, 10 ft length	\$9.00
1 EA - 3/4" X 3/4" X 3/4" copper Tee	\$1.22
1 EA - 3/4" copper 90 deg elbow	\$0.66
1 EA - 3/4" copper end cap	\$0.50
1 EA 3/4" X 1/2" copper coupling	\$0.98
1 EA 1/2" copper cap	\$0.45
2 EA 3/4" copper clamps	\$3.49
3 EA 2 1/4" stainless hose clamps	\$2.98
1 EA SO-239 connector	\$3.29
1 EA Mast Pole – 5 FT	\$7.85
1 EA ground rod clamp	\$2.50
TOTAL	\$42.92

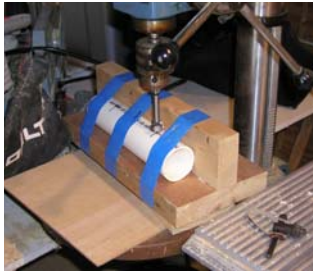
FABRICATION

Cut the copper pipe to length and dry fit to check dimensions with the design lengths prior to soldering.

A plumber's tube cutter was used to cut the pipe to length. Measure to the inside face of copper pipe (dimensions "A" and "D"). The location of the transition from 3/4" to 1/2" on the longer pipe does not affect the performance of the antenna; use the length to minimize waste (see drawing). . (Continued on next page)



SIX METER J-POLE (continued from previous page)



Apply plumbers flux paste to the joint you are working with. Use a propane torch to heat the pipe, and apply plumber's solder. Wipe excess solder from the joint immediately after applying. Assemble in smaller modules; lower part of J-Pole first, then add transition from $\frac{3}{4}$ " to $\frac{1}{2}$ " extension after. During the research phase, I learned that the antenna performs better if both the long leg and the short leg of the j-pole are aligned and parallel. This is easily accomplished by carefully drilling a piece of PVC pipe to the OD of the copper pipe. Secure the PVC to a block to support it while drilling to maintain parallel holes. If available, use a forstner bit (a precision carpenters bit) for a snug fit to the copper pipe using a drill press if possible. Yes, you may

notice that I initially drilled the PVC at the wrong spacing. I then turned the PVC 90 degrees, measured twice, and finally drilled at the correct spacing.

The wooden spacer was changed to a PVC spacer from the K4ABT design. The snug fit from the forstner bit allowed me to press it on by hand and it did not need to be secured to the copper pipe. Adding the PVC stiffened the entire bottom portion of the j-pole and I highly recommend using it since the overall length of the antenna is over 13 feet (above the mast).

Prepare one end of the feed line to attach the coax center wire to the long leg of the copper j-pole and the coax shield braid to the short leg. Using copper clamps to attach the feed points to the copper pipe allows for adjustment should you change the target frequency selected during the design phase. Add silicone sealant to weatherproof the exposed end of the coax. Belden 9913 cable was used and found easy to work with. Mount a PL-259 at the end of the feed line closest to the radio.



Roll 4 turns of coax in a 5" diameter coil or use a 1:1 balun and support it from the j-pole with Ty-wraps. I checked the location of the feed point clamps while on the ladder. To get the correct height without measuring up on the ladder, use a spacer block of wood pre-cut so the centerline of the clamp is located at the design height (dimension "C") then tighten the clamps to the copper pipe.

MOUNTING & GROUNDING



Static relief and lightning protection (if such a thing exists) is provided via a Polyphaser model IS-B50LU-CO (\$64.95) mounted in a junction box located in the eaves of the garage out of the weather. One coax feed line connects from the antenna to the Polyphaser (about 25 ft) and from there another 50 feet to the shack in the basement. The Polyphaser is

also grounded independently to the ground rod. Wall mount brackets from Radio Shack secured the 5 ft mast to the gable end of the garage roof. An 8-foot ground rod was previously installed nearby and used for the 2M/70cm antenna.



Get some help to mount the antenna; don't risk falling off the ladder! Mount the mast first, and then bring the antenna up the ladder. Attach the coax to the antenna while it is on the ground. Secure the coil to the antenna via tie wraps let the lower portion of the coax hang down. Keep some zip ties handy to secure the antenna to the mast initially then finish securing the antenna to the mast with the hose clamps. This will help keep your balance when erecting the antenna. Use a "drip loop" in the coax, several inches away from the house, to divert rainwater traveling down the outside of the coax. (Continued on next page)

SIX METER J-POLE (continued from previous page)

Apply sealant to the top of the coax (at connection points to copper pipe) to prevent water entering the inner coax. Clamp a ground wire to the mast or the lower support of the J-Pole and connect the ground wire to the grounding rod.

OPERATING

Give the entire system a last minute look before connecting to the transceiver. After connecting, listen around first before transmitting. If you hear something that does not sound right, disconnect the radio and troubleshoot. Transmitting on a faulty antenna could damage your transceiver. It is recommended that you test the SWR before transmitting. I was pleased when I measured an SWR of 1.2 of the assembled antenna in its mounted position on my new Jetstream VHF/UHF SWR & Power Meter.

Operate on lower power to nearby locations first to confirm the antenna is performing well. Initial reports indicated a great signal was getting out. We then tried to work Mt. Greylock, the target repeater some 90 miles to the west. At 10 watts the signal was reported 100% copy with moderate white noise. At 50 watts, the signal report improved to 100% copy with light white noise, very respectable. The best part of building a homebrew antenna is operating with it when completed!

CONCLUSION

Building the copper j-pole is a project within reach of most amateur radio operators. The project could be easily completed in a weekend. Do not be afraid to innovate if you see a way to improve a design you have found such as the PVC spacer, and the feed line attachments to the copper pipe. Although my radio is limited to FM mode only on Six, the antenna will perform well for an all mode radio. The success of project has motivated me to consider building other homebrew antenna projects. I look forward to working your station on Six real soon; 73 from James, KB1LOY.

MMRA Board Minutes

Bob Evans, N1BE

The MMRA Board met at 7:30 PM in Chin's Restaurant, Marlboro MA on February 15th. Present were K1IW, W3EVE, K1KWP, W1BRI and N1BE. The following summarizes the items discussed.

Kevin, K1KWP presented a Treasurer's report, which highlighted the change in our balance since the last board meeting and expected expenses for the remainder of the year. Although we received dues for about 10 memberships, our balance is down a few hundred dollars since we paid many bills.

Bryan, W1BRI discussed progress at the new repeater site at Inman Hill in Mendon MA. The 146.61 repeater is ready to install. We are looking for use of a bucket truck to install our antenna on the Mendon tower.

ADDITIONAL PHOTOS OF THE NEW MENDON REPEATER

Photos by Bryan, W1BRI



MMRA Board Meeting minutes (continued from previous page)

Cost to rent a truck is perhaps \$450 for one day. (Continued on next page) Several MMRA officers are exploring less costly alternatives and will ask if KB1LOY, our Mendon contact, can help.

At Brookline, '82 has been sounding like it's getting de-sensed and tripping with no apparent input signal. Bryan inserted a 2-Meter band pass filter between the antenna and the duplexer. However, he suspects a harmonic of the link radio channel element is only 22KHz from the repeater input frequency and thus raising the noise floor.

We also discussed the fact that Stoneham kerchunks the network when both VHF and UHF ports are linked to the hub. K1IW suggested trying an anti-kerchunk algorithm in the controller macros. Also mentioned was the fact that we will need to replace an antenna at Stoneham soon; it was suggested as a budget item for next fiscal year.

Although a few club members will be at the Algonquin Flea on Feb 18th, we declined to utilize the offered free MMRA table.

Bob, K1IW, mentioned that our speaker at the March meeting is Lou, N1UEC. The topic is Angel Flight public service in the Hurricane Katrina aftermath. We had not selected a location for the March meeting. A possible meeting venue at one board member's worksite in Waltham was discussed.

MMRA participation at the Boxboro ARRL convention was discussed in detail. MMRA will provide talk-in on our repeaters. We will hide our foxbox. MMRA will help direct traffic in the parking lot. In return we will have our usual hospitality suite near the function rooms. K1KWP volunteered to create a duty roster; he will be lining up MMRA members to help with the Boxboro activities. K1IW mentioned we would use the club banner at the booth.

A raffle and other activities were approved to generate interest in the club and attract visitors to our suite.

- We will raffle two items each costing about \$100. An HT and a Power/SWR meter were proposed.
- Raffle tickets will cost \$1 each or \$5 for 7 tickets.
- 5 free raffle tickets will be given to anyone who pays two years of dues at our booth.
- Raffle winners will be drawn about 1PM on Sunday. Winners will need to be present to claim their prize.

The fox box will be moved so it can be hunted in one location on Saturday and in another location on Sunday. Fox box finders will be announced at 5PM on Saturday and 1PM on Sunday.

W1BRI planned to have a MMRA Slide Show that could be displayed from a laptop computer in the MMRA suite.

Nominations for officer elections at the "annual" meeting in May were discussed.

Finally, K1IW mentioned that we might get a better price than previously for using a meeting room at the Campion center. Consequently we are considering meeting there in May. All present were willing to continue in their current office. We need to check with the others whose term will expire this year and appoint a nominating committee if we do not have a candidate for each office.

ADDITIONAL PHOTOS OF THE NEW MENDON REPEATER

Photos by Bryan, W1BRI



ANNOUNCEMENTS

Upcoming Flea Markets

Framingham Amateur Radio Association – Sunday March 26

The Framingham ARA will hold its spring flea market on Sunday, March 26, 2006 at the Walsh Middle School in Framingham. For more info go to www.fara.org/flea.

Upcoming Public Service Events

✈ Boston Marathon - Monday, April 17th

Lots of Ham Volunteers are needed in positions from Hopkinton to Boston!
see <http://marc.amateur-radio.net> for details!

✈ Walk for Hunger – Sunday, May 7th

Lots of Ham Volunteers are needed in positions from Boston to Newton!
see <http://cpsg.amateur-radio.net> for details!

MMRA VE Sessions

3rd Saturday of each Month
9 AM at the Marlboro Public Library
Contact: Bill Wade, K1IJ
781-891-9079 Evenings 6 to 10 PM,
Weekends 8 AM to 10 PM.
Accredited by the ARRL VEC

NEWSLETTER EDITOR NEEDED!

We need a newsletter editor! If you think you are qualified, and are interested in putting together this most important part of the club, please contact us by email at board@mmra.org

NEXT CLUB MEETING WEDNESDAY – MARCH 15th

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